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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,375	09/02/2004	Andries Pieter Hekstra	NL 020183	1197

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EXAMINER	
CHAUDRY, MUJTABA M	
ART UNIT	**PAPER NUMBER**
2133	

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/506,375	HEKSTRA ET AL.	
	Examiner	Art Unit	
	Mujtaba K. Chaudry	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-12* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 September 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Oath/Declaration

The Oath filed September 02, 2004 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Drawings

The drawings are objected to because:

- Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
- Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37

CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

- Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Appropriate correction is required.

Specification

The disclosure is objected to because of the following informalities:

Applicant is reminded of the proper language and format for an abstract of the disclosure.

> ***The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract***

should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title or claim(s). It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it is not in conformance with the requirements stated in the MPEP. Applicants are suggested to rewrite the abstract using the information stated above including limiting the abstract to a single paragraph and not more than 150 words.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(e) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(f) BRIEF SUMMARY OF THE INVENTION.
(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(h) DETAILED DESCRIPTION OF THE INVENTION.

(i) CLAIM OR CLAIMS (commencing on a separate sheet).
(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Content of Specification

(a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.

(b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.

(c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.

(d) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

Or alternatively, Reference to a "Microfiche Appendix": See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.

(e) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

(1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."

(2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and

problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(f) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(g) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(h) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

(i) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

(j) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the

World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

(k) Sequence Listing, See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

The disclosure is objected to because it is not in conformance with the requirements stated herein-above. For example, the specification does not specifically have sub-headings for the "field of invention," "background of invention," "summary" etc.

Appropriate correction is required.

Allowable Subject Matter

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The term "possibly" in lines 1 and 6 renders the claim indefinite because it raises doubt if the codewords are infact mutilated.

- The phrase "...having a known relationship..." in line 4 renders the claim indefinite because the claim does not state the relationship nor does it mention to what the relationship is to.

Claim 1 recites the limitation "the differences" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar (USPN 6246698) further in view of Yonge (USPN 6289000).

As per claim 1, Kumar substantially teaches a digital data transmission system wherein redundant source bit information is transmitted in both the upper and lower sidebands so that the loss of information in either one but not both sidebands due to large amounts of interference or distortion, caused by, for example, first-adjacent interference, does not deleteriously affect the IBOC DAB receiver performance. The system exhibits both frequency-diversity and time-diversity. The receiver determines which codeword bit estimate, corresponding to either upper

or lower sideband signals, is less likely to be erroneous. The receiver system selects between decoded estimates for each pair of demodulated ECC codewords or combines both ECC codeword estimates prior to decoding in certain embodiments. Particularly, Kumar teaches (cols. 30-31) that for each pair of received codeword estimates, the receiver system combines codeword estimates or selects between decoded codeword by determining a metric which corresponds to the probability of error in each of the decoded codeword estimates. In certain embodiments, the metric is computed by ECC decoding some or all of the bits for both received codeword estimates and then re-encoding the two decoded estimates to re-generate the pair of ECC codewords. The number of differences in bit positions (i.e. the Hamming distance) between each of the re-encoded estimates and the corresponding received estimate, prior to decoding and re-encoding, is approximately proportional to the bit error rate (BER) for the codeword prior to decoding. When the determined BER estimates for the two codeword estimates are substantially different, the receiver system selects the decoded codeword from the pair with the lower BER (smaller Hamming distance) for propagation as the most probable source bit information for that codeword. In certain embodiments of the receiver, when the BER estimate is substantially equal for both codewords in each pair, the codeword estimates are combined in order to increase the signal-to-noise ratio (SNR) since the redundant contributions add approximately coherently and the noise contributions add approximately incoherently. In this circumstance, the combined codeword estimate is then ECC decoded to generate the source bit message estimate for the codeword. Since the error metrics are not determined until after first decoding the upper and lower codewords separately, this requires a second decoding step. In certain embodiments of the invention, instead of determining the error metric by comparing the bit differences between the

codeword and re-encoded codeword estimates after ECC decoding, when convolutional encoding is implemented with maximum-likelihood Viterbi decoding, the accumulated Viterbi algorithm branch metrics for the terminal state of each codeword are compared. The terminal state of each codeword is known without ambiguity in the receiver because of the finite-length codewords in the transmitter invention. When the difference between accumulated Viterbi algorithm branch metrics for the upper and lower codeword estimates is small, the codewords may be combined and re-decoded. When the difference in branch metrics is substantial, the decoded codeword with the smaller branch metric sum is propagated as the source bit estimate. In embodiments where the upper and lower sideband codewords are combined when the error metrics are sufficiently similar, the bit estimates which constitute the codeword may be combined (summed) directly or the demodulator samples (e.g. correlation sums determined by matched filtering and sampling) may be combined (summed), and the combined codeword estimate, to be decoded, determined from the combined demodulator samples (information), depending upon the modulation method.

Kumar does not explicitly teach to use a generator matrix to obtain the information word embedded in said decoded codeword as stated in present application.

However, Yonge teaches, in an analogous art, an encoder/decoder scheme for robust transmission of PHY layer frame control information (to support medium access) in OFDM frames (or packets). The PHY layer frame control information to be modulated onto carriers in OFDM symbols is encoded using a product coding to form a product code block or matrix. The product coding is based on a shortened hamming code codeword set having properties of symmetry. Elements of the product code matrix are interleaved so that the elements are

modulated onto the carriers of the symbols in diagonal groupings (across time and frequency) and with some degree of redundancy. The modulated elements are demodulated to produce soft decision values, which are de-interleaved to combine copies of the soft values for elements and re-order the soft values in the order of the elements prior to interleaving. The soft values for each row and each column are provided to a turbo product decoder, which performs a number of iterations of row/column decoding, each iteration applying a weighting to the results to enhance the reliability of the results of each next successive iteration. Upon completion of the final iteration, the decoder applies a hard decision to the soft values to produce a set of hard values for each of the soft values that corresponds to the frame control information. Given the symmetry of the code set, the row/column decoding generates a complete set of correlation values from only a subset of the complete set of correlation values and uses a reduced number of MAP decoding operations to select the best correlation values for each of the soft values. In particular, Yonge teaches (col. 3) to use a generator matrix to obtain the information word embedded in said decoded codeword. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a generator matrix to obtain the information word embedded in said decoded codeword of Yonge with the method and apparatus of Kumar. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill would have recognized that by having a generator matrix to obtain the information word would have significantly reduced decoding complications.

As per claim 2, Kumar substantially teaches, in view of above rejections, (col. 30) the receiver system combines codeword estimates or selects between decoded codeword by

determining a metric which corresponds to the probability of error in each of the decoded codeword estimates, which is performed by way of majority voting.

As per claim 3, Kumar substantially teaches, in view of above rejections, (Figure 4) source message 37 is optionally scrambled by bit scrambler 39. Bit scrambler 39 eliminates long consecutive runs of binary digits zero and one and causes binary digits zero and one to have approximately equal probabilities of occurrence after scrambling. The function of scrambler 39 is used in certain embodiments because certain types of error correction coding, synchronization, and/or equalization methods presume that the transmitted data is approximately random for optimum performance. Scrambler 39 is typically implemented by multiplying source message 37 by certain types of binary polynomials and summing using binary arithmetic.

As per claim 4, Yonge substantially teaches, in view of above rejections, (abstract) elements of the product code matrix are interleaved so that the elements are modulated onto the carriers of the symbols in diagonal groupings (across time and frequency) and with some degree of redundancy. The modulated elements are demodulated to produce soft decision values, which are de-interleaved to combine copies of the soft values for elements and re-order the soft values in the order of the elements prior to interleaving. The soft values for each row and each column are provided to a turbo product decoder, which performs a number of iterations of row/column decoding, each iteration applying a weighting to the results to enhance the reliability of the results of each next successive iteration. Upon completion of the final iteration, the decoder applies a hard decision to the soft values to produce a set of hard values for each of the soft values that corresponds to the frame control information.

As per claims 5-8 and 10, Kumar substantially teaches, in view of above rejections, (cols. 30-31) that for each pair of received codeword estimates, the receiver system combines codeword estimates or selects between decoded codeword by determining a metric which corresponds to the probability of error in each of the decoded codeword estimates. In certain embodiments, the metric is computed by ECC decoding some or all of the bits for both received codeword estimates and then re-encoding the two decoded estimates to re-generate the pair of ECC codewords. The number of differences in bit positions (i.e. the Hamming distance) between each of the re-encoded estimates and the corresponding received estimate, prior to decoding and re-encoding, is approximately proportional to the bit error rate (BER) for the codeword prior to decoding. When the determined BER estimates for the two codeword estimates are substantially different, the receiver system selects the decoded codeword from the pair with the lower BER (smaller Hamming distance) for propagation as the most probable source bit information for that codeword.

As per claim 11, Kumar substantially teaches a digital data transmission system wherein redundant source bit information is transmitted in both the upper and lower sidebands so that the loss of information in either one but not both sidebands due to large amounts of interference or distortion, caused by, for example, first-adjacent interference, does not deleteriously affect the IBOC DAB receiver performance. The system exhibits both frequency-diversity and time-diversity. The receiver determines which codeword bit estimate, corresponding to either upper or lower sideband signals, is less likely to be erroneous. The receiver system selects between decoded estimates for each pair of demodulated ECC codewords or combines both ECC codeword estimates prior to decoding in certain embodiments. Particularly, Kumar teaches (cols.

30-31) that for each pair of received codeword estimates, the receiver system combines codeword estimates or selects between decoded codeword by determining a metric which corresponds to the probability of error in each of the decoded codeword estimates. In certain embodiments, the metric is computed by ECC decoding some or all of the bits for both received codeword estimates and then re-encoding the two decoded estimates to re-generate the pair of ECC codewords. The number of differences in bit positions (i.e. the Hamming distance) between each of the re-encoded estimates and the corresponding received estimate, prior to decoding and re-encoding, is approximately proportional to the bit error rate (BER) for the codeword prior to decoding. When the determined BER estimates for the two codeword estimates are substantially different, the receiver system selects the decoded codeword from the pair with the lower BER (smaller Hamming distance) for propagation as the most probable source bit information for that codeword. In certain embodiments of the receiver, when the BER estimate is substantially equal for both codewords in each pair, the codeword estimates are combined in order to increase the signal-to-noise ratio (SNR) since the redundant contributions add approximately coherently and the noise contributions add approximately incoherently. In this circumstance, the combined codeword estimate is then ECC decoded to generate the source bit message estimate for the codeword. Since the error metrics are not determined until after first decoding the upper and lower codewords separately, this requires a second decoding step. In certain embodiments of the invention, instead of determining the error metric by comparing the bit differences between the codeword and re-encoded codeword estimates after ECC decoding, when convolutional encoding is implemented with maximum-likelihood Viterbi decoding, the accumulated Viterbi algorithm branch metrics for the terminal state of each codeword are compared. The terminal

state of each codeword is known without ambiguity in the receiver because of the finite-length codewords in the transmitter invention. When the difference between accumulated Viterbi algorithm branch metrics for the upper and lower codeword estimates is small, the codewords may be combined and re-decoded. When the difference in branch metrics is substantial, the decoded codeword with the smaller branch metric sum is propagated as the source bit estimate. In embodiments where the upper and lower sideband codewords are combined when the error metrics are sufficiently similar, the bit estimates which constitute the codeword may be combined (summed) directly or the demodulator samples (e.g. correlation sums determined by matched filtering and sampling) may be combined (summed), and the combined codeword estimate, to be decoded, determined from the combined demodulator samples (information), depending upon the modulation method.

Kumar does not explicitly teach to use a generator matrix to obtain the information word embedded in said decoded codeword as stated in present application.

However, Yonge teaches, in an analogous art, an encoder/decoder scheme for robust transmission of PHY layer frame control information (to support medium access) in OFDM frames (or packets). The PHY layer frame control information to be modulated onto carriers in OFDM symbols is encoded using a product coding to form a product code block or matrix. The product coding is based on a shortened hamming code codeword set having properties of symmetry. Elements of the product code matrix are interleaved so that the elements are modulated onto the carriers of the symbols in diagonal groupings (across time and frequency) and with some degree of redundancy. The modulated elements are demodulated to produce soft decision values, which are de-interleaved to combine copies of the soft values for elements and

re-order the soft values in the order of the elements prior to interleaving. The soft values for each row and each column are provided to a turbo product decoder, which performs a number of iterations of row/column decoding, each iteration applying a weighting to the results to enhance the reliability of the results of each next successive iteration. Upon completion of the final iteration, the decoder applies a hard decision to the soft values to produce a set of hard values for each of the soft values that corresponds to the frame control information. Given the symmetry of the code set, the row/column decoding generates a complete set of correlation values from only a subset of the complete set of correlation values and uses a reduced number of MAP decoding operations to select the best correlation values for each of the soft values. In particular, Yonge teaches (col. 3) to use a generator matrix to obtain the information word embedded in said decoded codeword. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a generator matrix to obtain the information word embedded in said decoded codeword of Yonge with the method and apparatus of Kumar. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill would have recognized that by having a generator matrix to obtain the information word would have significantly reduced decoding complications.

As per claim 12, Yonge substantially teaches, in view of above rejections, (col. 22) a computer program residing on a computer-readable medium for encoding data for an OFDM transmission, the computer program comprising instructions.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts are included herein for Applicant's review.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817. The examiner can normally be reached on Mon-Thur 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mujtaba Chaudry
Art Unit 2133
December 26, 2005

ALBERT DECADY
SUPERVISORY PATENT EXAMINER